

WHAT IS CLAIMED IS:

1. A liquid crystal display, comprising:
a back light unit to produce and supply light;
a collimating sheet to collimate the light supplied by the back light unit;
a cholesteric liquid crystal (CLC) polarizer to transmit one of left-circularly polarized light and right-circularly polarized light from the collimating sheet, and to reflect other light not transmitted;
a lower substrate on which a CLC color filter layer is formed wherein the CLC color filter layer transmits the circularly polarized light from the CLC polarizer having specific red, green, and blue wavelengths and reflects other light not transmitted;
a liquid crystal layer to selectively revolve a polarized direction of the circularly polarized light from the CLC color filter layer;
an upper substrate over the liquid crystal layer having a hologram diffuser and a planarization layer disposed thereon and wherein the hologram diffuser diffuses the revolved circularly polarized light from the liquid crystal layer; and
a linear polarizing transformer to transform the diffused circularly polarized light from the hologram diffuser into linearly polarized light.

2. The liquid crystal display according to claim 1, wherein the linear polarizing transformer includes
a $\lambda/4$ film to transform the circularly polarized light into linearly-polarized light,
a compensating film over the $\lambda/4$ film, and
a linear polarizer over the compensating film.

3. A liquid crystal display, comprising:
a back light unit to produce and supply light;
a collimating sheet to collimate the light supplied by the back light unit;
a cholesteric liquid crystal (CLC) polarizer to transmit one of left-circularly

polarized light and right-circularly polarized light from the collimating sheet, and to reflect other light not transmitted;

a lower substrate on which a CLC color filter layer is formed wherein the CLC color filter layer transmits the circularly polarized light from the CLC polarizer having specific red, green, and blue wavelengths and reflects other light not transmitted;

a $\lambda/4$ film to transform the circularly polarized light from the CLC color filter layer into linearly-polarized light;

a first linear polarizer above the $\lambda/4$ film;

a liquid crystal layer to selectively transmit the linearly-polarized light; and

an upper substrate over the liquid crystal layer having a hologram diffuser and a planarization layer disposed thereon and wherein the hologram diffuser diffuses the linearly-polarized light from the liquid crystal layer.

4. The liquid crystal display according to claim 3, wherein the $\lambda/4$ film is coated with a liquid crystal layer which has been hardened by light irradiation.

5. The liquid crystal display according to claim 3, wherein the first linear polarizer includes a direct coating polarizer.

6. The liquid crystal display according to claim 3, further comprising:
a second linear polarizer to transform the diffused linearly polarized light from the hologram diffuser into linearly polarized light.

7. A liquid crystal display, comprising:
a back light unit to produce and supply light;
a collimating sheet to collimate the light supplied by the back light unit;
a cholesteric liquid crystal (CLC) polarizer to transmit one of left-circularly polarized light and right-circularly polarized light from the collimating sheet, and to reflect other light not transmitted;

a $\lambda/4$ film to transform the circularly polarized light from the CLC polarizer into linearly-polarized light;

a linear polarizer above the $\lambda/4$ film;

a lower substrate above the linear polarizer;

a liquid crystal layer above the lower substrate; and

an upper substrate over the liquid crystal layer having a hologram diffuser, a planarization layer, and an absorbing type color filter layer disposed thereon and wherein the hologram diffuser diffuses the linearly-polarized light from the liquid crystal layer.

8. A liquid crystal display, comprising:

a back light unit to produce and supply light;

a collimating sheet to collimate the light supplied by the back light unit;

a cholesteric liquid crystal (CLC) polarizer to transmit one of left-circularly polarized light and right-circularly polarized light from the collimating sheet, and to reflect other light not transmitted;

a lower substrate on which a CLC color filter layer is disposed wherein the CLC polarizer transmits light from the CLC polarizer having specific red, green, and blue wavelengths and reflects other light not transmitted;

a liquid crystal layer; and

an upper substrate over the liquid crystal layer having a hologram diffuser, a planarization layer, and a linear polarizer disposed thereon and wherein the hologram diffuser diffuses light from the liquid crystal layer.

9. The liquid crystal display according to claim 8, wherein the CLC color filter layer includes dichromic acid photoinitiator.

10. A liquid crystal display, comprising:

a back light unit to produce and supply light;

a collimating sheet to collimate the light supplied by the back light unit;
a cholesteric liquid crystal (CLC) polarizer to transmit circularly polarized light of a predetermined direction from the collimating sheet, and to reflect other light not circularly polarized in the predetermined direction;
a lower substrate above the CLC polarizer;
an upper substrate above the lower substrate including a holographic diffuser disposed thereon and wherein the hologram diffuser diffuses light without altering a polarization of the light;
a liquid crystal layer disposed between the lower substrate and the upper substrate;
a color filter layer to transmit only predetermined wavelengths of light disposed between the lower substrate and the upper substrate; and
an upper linear polarizer above the upper substrate.

11. The liquid crystal display according to claim 10, wherein the color filter layer includes

a CLC color filter layer to transmit the circularly polarized light of the predetermined direction from the CLC polarizer, and to reflect other light not circularly polarized in the predetermined direction.

12. The liquid crystal display according to claim 10, wherein the color filter layer includes

an absorbing type color filter layer.

13. The liquid crystal display according to claim 10, further comprising:

a $\lambda/4$ film disposed below the upper linear polarizer to transform the circularly polarized light of the predetermined direction into linearly-polarized light.

14. The liquid crystal display according to claim 10, wherein the back light

unit includes:

a reflecting plate to recycle the other light initially reflected by the CLC polarizer up toward the CLC polarizer.

15. The liquid crystal display according to claim 10, further comprising:
a compensating film disposed between the $\lambda/4$ film and the upper to transform light into linearly-polarized light.